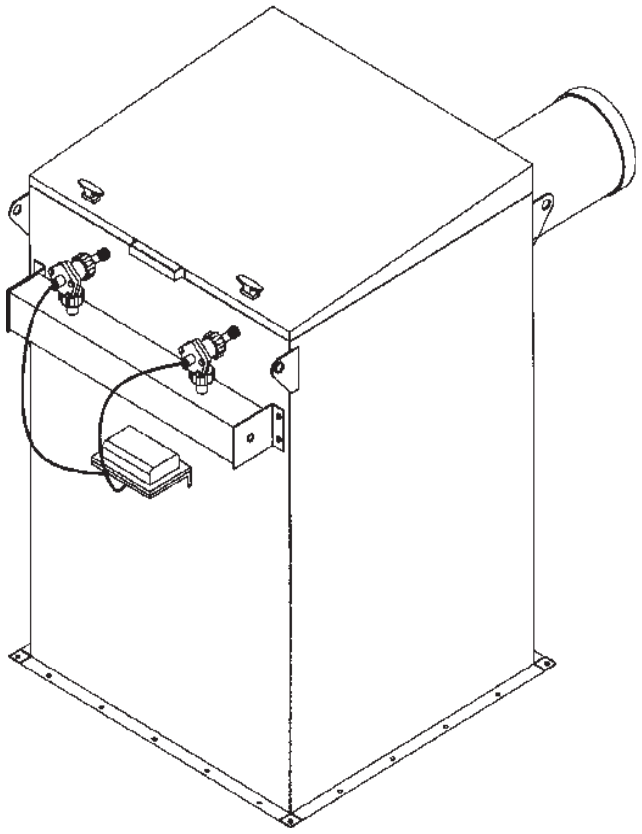
Donaldson®
Torit®

Installation and Operation Manual

Installation, Operation, and Service Information

Bin Vent
Models TBV-2, TBV-4, and TBV-6



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Illustrations are for reference only as actual product may vary.

This manual is property of the owner. Leave with the unit when set-up and start-up are complete. Donaldson Company reserves the right to change design and specifications without prior notice.

IOM 4939000
Revision 6

⚠WARNING **Application of Fume Control Equipment**

Combustible materials such as buffing lint, paper, wood, metal dusts, weld fume, or flammable coolants or solvents represent potential fire and/or explosion hazards. Use special care when selecting, installing, and operating all dust, fume, or mist collection equipment when such combustible materials may be present in order to protect workers and property from serious injury or damage due to a fire and/or explosion.

Consult and comply with all National and Local Codes related to fire and/or explosion properties of combustible materials when determining the location and operation of all dust, fume, or mist collection equipment.

When combustible materials are present you must consult with an expert in fire extinguishing and/or explosion protection systems, who is also familiar with the local codes, for support and guidance on the selection and installation of an appropriate fire and/or explosion protection system.

DO NOT allow sparks, cigarettes or other burning objects to enter the hood or duct of any dust, fume, or mist collection equipment as these may initiate a fire or explosion of any combustible materials accumulated in the collector.

Improper operation of a dust, fume, or mist control system may contribute to conditions in the work area or facility that could result in severe personal injury and product or property damage. Check that all dust, fume, or mist collection equipment is properly selected, installed, and operated for its intended use.

This manual contains specific precautionary statements relative to worker safety. Read this manual thoroughly and comply as directed. Instruct all personnel on the safe use and maintenance procedures related to this equipment. Discuss any questions on the application, use, or maintenance of this equipment with a Donaldson Torit representative.

For optimum collector performance, use only Donaldson Torit replacement parts.

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⚠ DANGER **DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.**

⚠ WARNING **WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION **CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**

NOTICE **NOTICE is used to address practices not related to personal injury.**

Data Sheet

Model Number _____ **Serial Number** _____

Ship Date _____ **Installation Date** _____

Customer Name _____

Address _____

_____

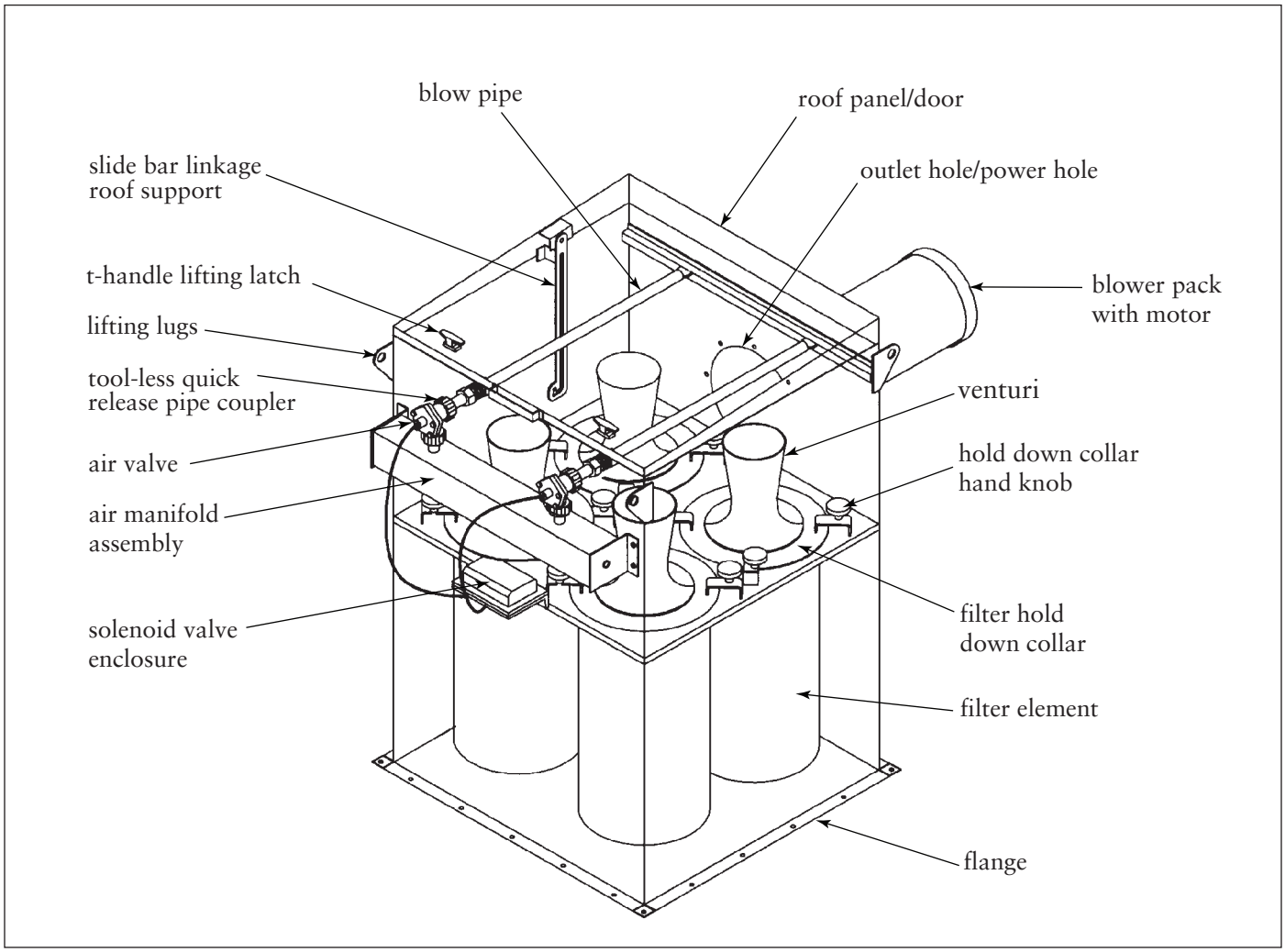
Filter Type _____

Accessories _____

Description

Torit Bin Vents (TBVs) apply cartridge technology to a continuous-duty dust collection system, offering significant advantages. They are designed specifically for silo, storage bin and conveyor transfer applications. Standard models include both the Insertable-mounted cabinet and the Plenum-mounted cabinet, with each available in three filter configurations: a two (2) filter unit (TBV-2), a four (4) filter unit (TBV-4) and a six (6) filter unit (TBV-6). All standard TBVs include Donaldson Torit® Ultra-Web® filters with continuous air pulse-jet cleaning. This provides for a highly efficient self-cleaning filtration system ensuring long filter life and a reduced maintenance schedule. The TBV was designed for simple filter service and maintenance with a "tool-less" approach. The unit incorporates top-side (clean air plenum) filter cartridge removal and replacement, making it unnecessary to enter the silo or storage container. No tools are needed for the quick release pipe couplers when replacing filters. This reduces the risk of contamination of the customer product stored in the silo/storage container.

The filter elements in the TBV are the key to efficient, long life operation. With the high efficiency filtration from this dust collector, exhaust air can often be recirculated to the factory. To ensure high efficiency operation, always use genuine Torit-Built® replacement filter elements for your TBV.



TBV Internal View

Purpose and Intended Use

⚠WARNING Misuse or modification of this equipment may result in personal injury.

Do not misuse or modify.

The Torit Bin Vent is used to vent displaced air and contain valuable and/or harmful products in bins or silos. As materials are conveyed to a bin by various means (mechanical, gravity, and pneumatic), air inside the enclosed bin is displaced. The process by which excess air is removed is called bin venting. The most common industries for the TBV are food/agriculture such as grain and process/ manufacturing such as chemical/pharmaceutical, cement, wood, foundries (clay, sand, additives), and waste treatment. The most common dusts are lime, cement, carbon, plastics, and wood.

⚠WARNING Combustible materials such as buffing lint, paper, wood, metal dusts, weld fume, or flammable coolants or solvents represent potential fire and/or explosion hazards. Use special care when selecting, installing, and operating all dust, fume, or mist collection equipment when such combustible materials may be present in order to protect workers and property from serious injury or damage due to a fire and/or explosion.

Consult and comply with all National and Local Codes related to fire and/or explosion properties of combustible materials when determining the location and operation of all dust, fume, or mist collection equipment.

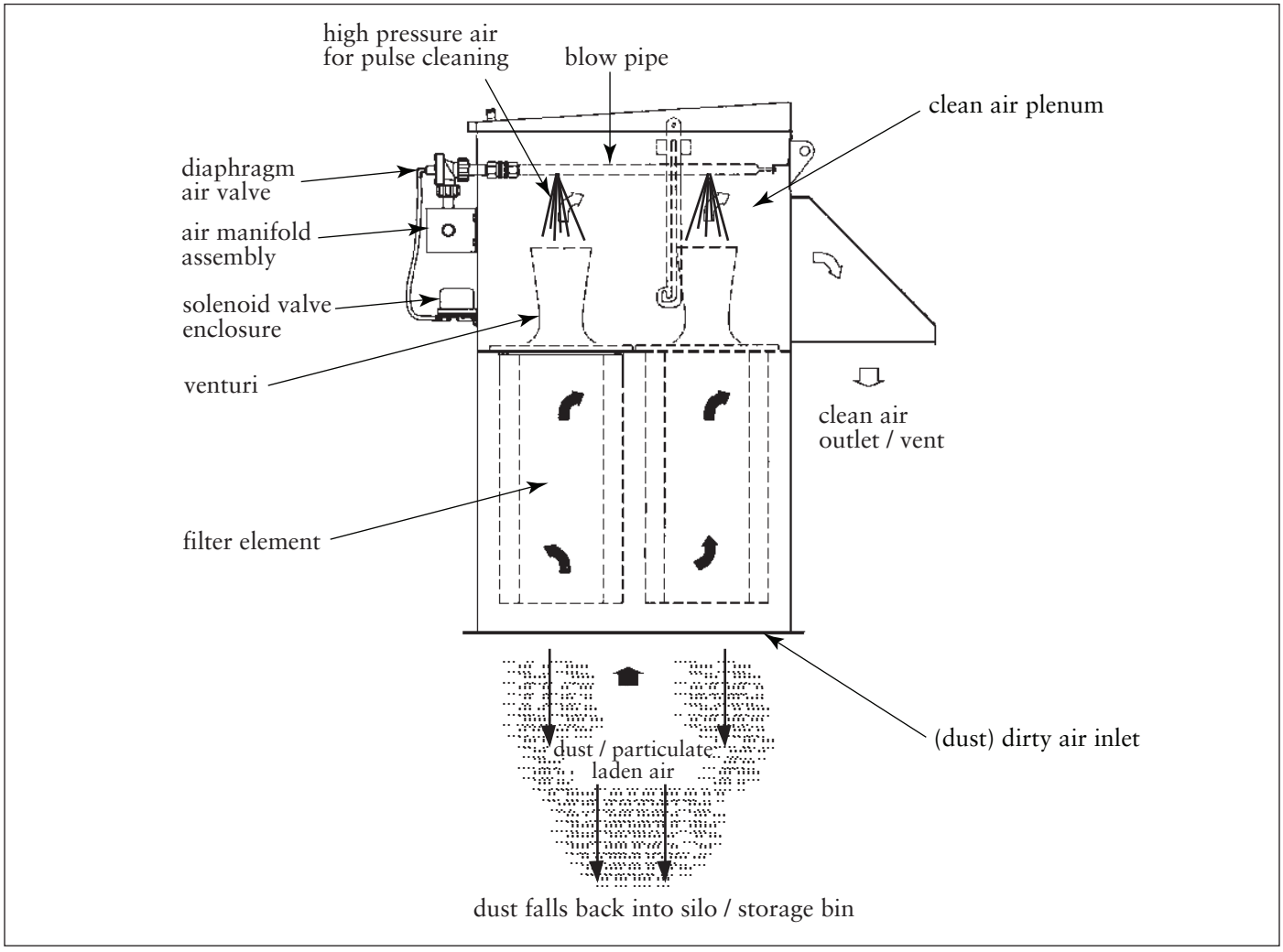
Standard Donaldson Torit equipment is *not* equipped with fire extinguishing or explosion protection systems.

Operation

During normal operation, contaminated or dust-laden air enters the TBV through the cabinet opening at the bottom of the unit, which is fastened to the silo or storage container. The dust-laden incoming air is collected on the outside surface of the filter elements. As the dust cake collects on the outside filter surface, gravity and air pulse-jet cleaning force the dust to drop back into the storage bin. The clean, filtered air flows up through the center of the filter elements and passes through the venturi into the clean air plenum, where it finally exits through the clean air outlet. The clean air outlet can be configured with a blower fan or a weather hood side-mounted to the rear of the unit. Another option, depending on the customer product being stored, is to recirculate the clean air back into the work area via duct work.

Filter Cleaning

The filter elements are cleaned automatically and continuously during operation. Only a few filters are off-line for pulse-jet cleaning at any given time. A solid state timer controls the cycle of pulse-jet cleaning. Solenoid-operated diaphragm valves open in sequence, introducing jets of high pressure air into venturis located above the filter element cartridges. The resulting reverse airflow initiates the cleaning cycle, which dislodges the dust accumulated on the outside of the filter media, while the remaining filter elements in the unit continue the filtration process.



Unit Operation (Model TBV-4 shown)

Inspection on Arrival

1. Inspect unit on delivery.
2. Report any damage to the delivery carrier.
3. Request a written inspection report from the Claims Inspector to substantiate claim.
4. File claims with the delivery carrier.
5. Compare unit received with description of product ordered.
6. Report incomplete shipments to the delivery carrier and your Donaldson representative.
7. Remove crates and shipping straps. Remove loose components and accessory packages before lifting unit from truck.

Installation Codes and Procedures

⚠CAUTION OSHA may have requirements regarding recirculating filtered air in your facility. Consult with the appropriate local authorities to ensure compliance with all codes regarding recirculating filtered air.

Safe and efficient operation of the unit depends on proper installation.

Authorities with jurisdiction should be consulted before installing to verify local codes and installation procedures. In the absence of such codes, install unit according to the National Electric Code, NFPA No. 70-latest edition.

A qualified installation and service agent must complete installation and service of this equipment.

All shipping materials, including shipping covers, must be removed from the unit prior to, or during unit installation.

NOTICE Failure to remove shipping materials from the unit will compromise unit performance.

Installation

Site Selection

The unit can be located in the top of storage silos and bins, or integrated into hoods for material handling equipment such as belt conveyors and bucket elevators or process equipment such as blenders and crushers.

Wind, seismic zone, and other live-load conditions must be considered when designing the mounting flange and hood supports for the collector. Reference the Rating and Specification Information section.

Provide appropriate clearance from heat sources and interference with utilities.

Unit Location

When hazardous conditions or materials are present, consult with local authorities for the proper location of the unit.

Mounting flanges and hood supports must be capable of supporting the entire weight of the unit plus the weight of the collected material, piping, and ductwork. Reference the Rating and Specification Information.

Locate the unit to ensure the shortest and straightest inlet- and outlet-duct length, easy access to electrical and compressed-air connections, and routine maintenance.

Rigging Instructions

⚠WARNING Failure to lift the collector correctly can result in severe personal injury or property damage.

Do not lift unit by the door handle.

Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the equipment.

A crane or forklift is recommended for unloading, assembly, and installation of the collector.

Location must be clear of all obstructions, such as utility lines or roof overhang.

Suggested Tools & Equipment

Crane or Forklift	Lifting Slings/Chains
Clevis Pins	Socket Wrenches
End Wrenches	Pipe Sealant
Hand Drill / Drill Bits	

Hoisting Information

Use all lifting points provided.

Use clevis connectors, not hooks, on lifting slings.

Use spreader bars to prevent damage to unit's casing.

Check the Specification Control drawing for weight and dimensions of the unit, subassemblies, and components to ensure adequate crane capacity.

Allow only qualified crane operators to lift the equipment.

Refer to applicable OSHA regulations and local codes when using cranes, forklifts, and other lifting equipment.

Lift unit and accessories separately, and assemble after unit is in place.

Use drift pins to align holes in mounting flanges during installation.

Electrical Wiring

⚠WARNING Electrical installation must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn off / lock out electrical power sources before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

All electrical wiring and connections, including electrical grounding, should be made in accordance with the National Electric Code, NFPA No. 70-latest edition.

Check local ordinances for additional requirements that apply.

The appropriate wiring schematic and electrical rating must be used. See unit's rating plate for required voltage.

If the unit is not furnished with a factory-mounted disconnect, an electric disconnect switch having adequate amp capacity shall be installed in accordance with Part IX, Article 430 of the National Electrical Code, NFPA No. 70-latest edition. Check unit's rating plate for voltage and amperage ratings.

Refer to the wiring diagram for the number of wires required for main power wiring and remote wiring.

Standard Equipment

Ship Loose Items

Items shipped loose with the TBV may include:

- Blower/Motor Pack*
- Filter Cartridges*
- Magnehelic/Photohelic Gauge
- Solid State Timer Control Box
- Plenum Silencer
- Damper Assembly

*In general, Torit Bin Vents are shipped without the blower/motor packs installed (shipped loose) to better protect the equipment during transit. Filter cartridges are shipped installed in the TBV plenum models. In the TBV insertable models, the filter cartridges are shipped loose to avoid crushing the portion of the filters that extend below the bottom of the cabinet.

Pre-Installation

The TBV is not designed as a "stand alone" unit. Rather, it is designed to be a filtration/ventilation component of a larger system, such as a silo or bin container. The open bottom of the bin vent is intended for roof mounting applications. Some preparation work is required before installing the unit. A hole must be cut into the silo or storage bin to the correct dimensions.

⚠WARNING Ensure the silo or storage bin is reinforced to properly support the weight of the TBV. Failure to do so may result in a collapse causing personal injury/and or property damage.

See the Specification Control Drawing for footprint dimensions and weights.

Filter Installation for TBV Insertable

The filter cartridges in the TBV insertable model extend past the bottom of the cabinet when installed. The filter cartridges would be crushed and damaged under the weight of the collector if they were shipped installed; therefore, they are shipped loose and installed at the customer site once the unit has been installed into a permanent location.

NOTICE See the Filter Element Installation section for plenum models.

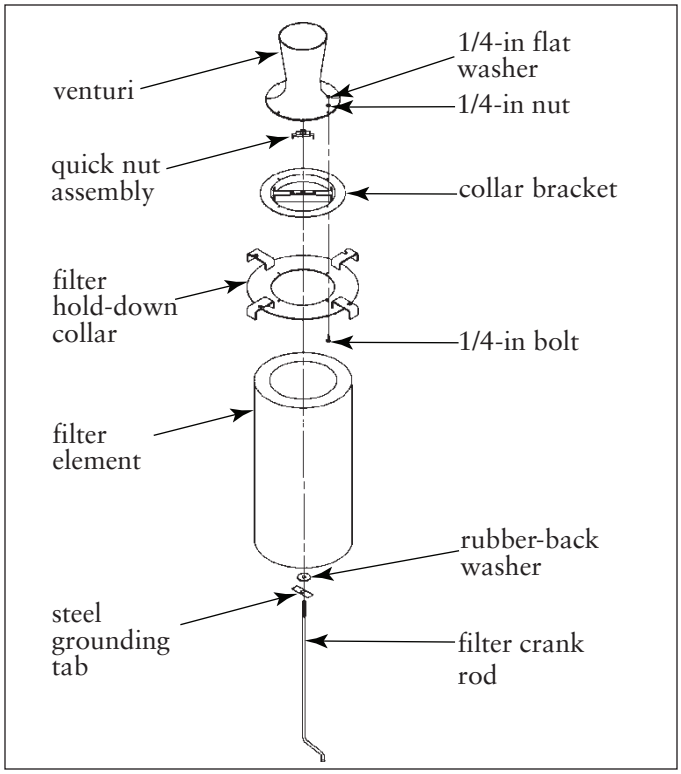
The TBV insertable-model must already be installed in a permanent location before the installation of the filter cartridges into the unit.

1. Unpack the filter cartridges from each box, which contains a filter element, a filter crank rod, a rubber-backed washer and a steel grounding tab.
2. Open the TBV top roof access door to its fully open position (small notch on bar).

⚠CAUTION Failure to open the door properly could result in personal injury. Ensure the door is in the correct open position.

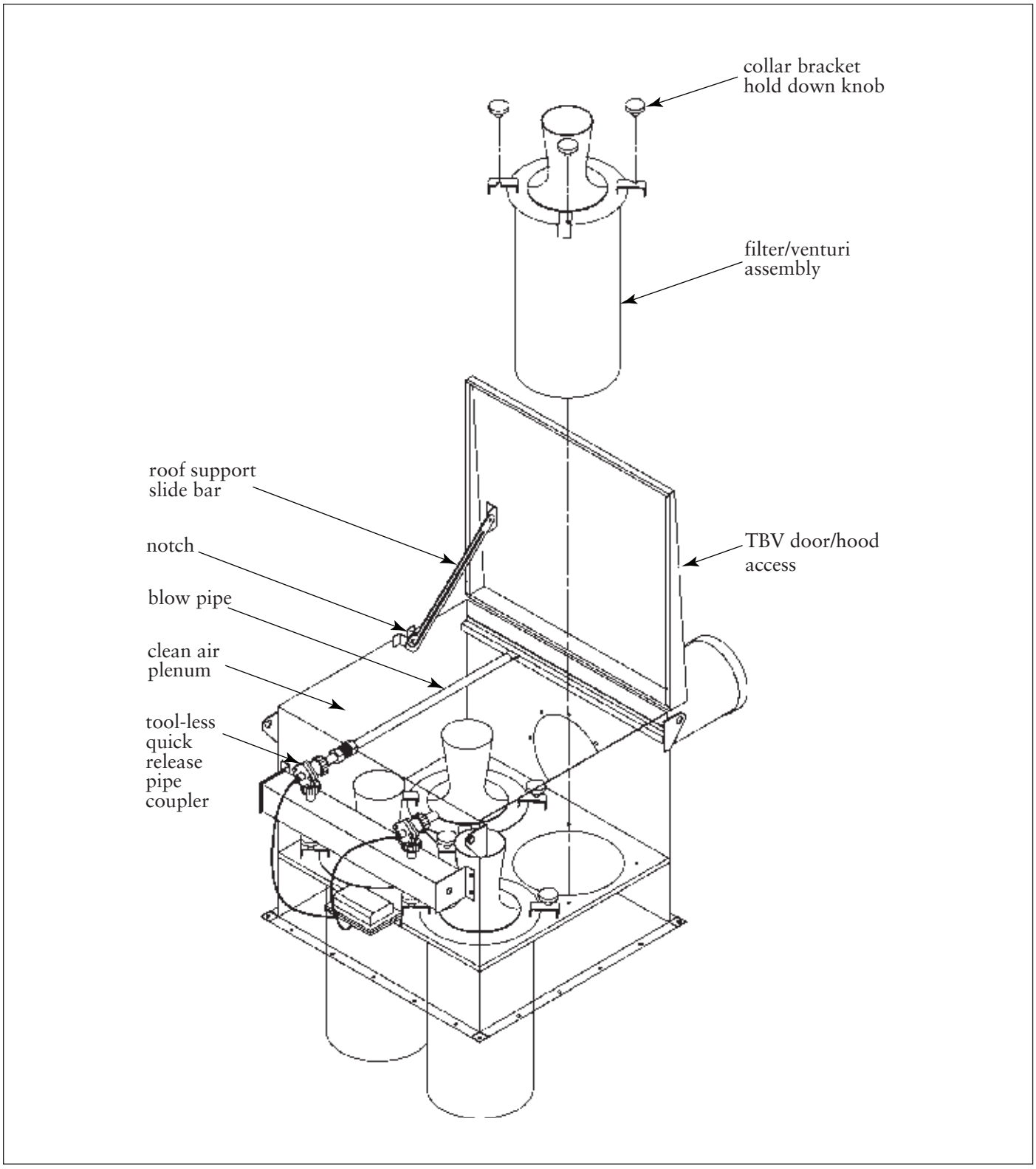
Once the roof is secured, reach inside the clean air plenum of the unit and disconnect the blowpipes by pulling back the levers of the quick release pipe couplers. Stow the blowpipes in an upright position by inserting them into the slots provided at the rear of the unit.

3. Reach down inside the clean air plenum of the unit and halfway unscrew all the black hold-down knobs. Reach down inside the venturi, grasp the collar bracket and twist to the right (clockwise) until the filter hold-down collar clears all four screw studs. Pull up and remove the filter hold-down collar assembly from the clean air plenum.
4. Place the new filter element end-cap down (gasket-side up). Slide the filter hold-down collar down inside the open end of the filter element until it stops. Lay the filter element on its side.



Filter / Venturi Assembly

5. Slide the steel grounding tab on to the filter crank rod, followed by the rubber-backed washer, rubber side up and away from the crank handle.
6. Slide the filter crank rod through the hole in the filter element end cap and up through the filter cartridge. Align the filter crank rod end with the quick-nut assembly located in the center of the hold-down collar bracket and screw together until the filter cartridge forms an air-tight seal against the filter hold-down collar.
7. Insert the complete filter/venturi assembly back into the clean air plenum until the hold-down collar is flush with the bottom of the clean air plenum (tubesheet). Rotate the assembly to the left (counterclockwise) until all four screw studs are engaged.
8. Tighten all block hold-down knobs until secure. Reconnect the blowpipes using the quick release pipe couplers.
9. Grasp the roof access door with one hand and with the other pull up on the bottom of the roof support slide bar to disengage the locked position. Lower the roof access door until it is closed. Secure it by twisting the T-handle latches on top of the roof.



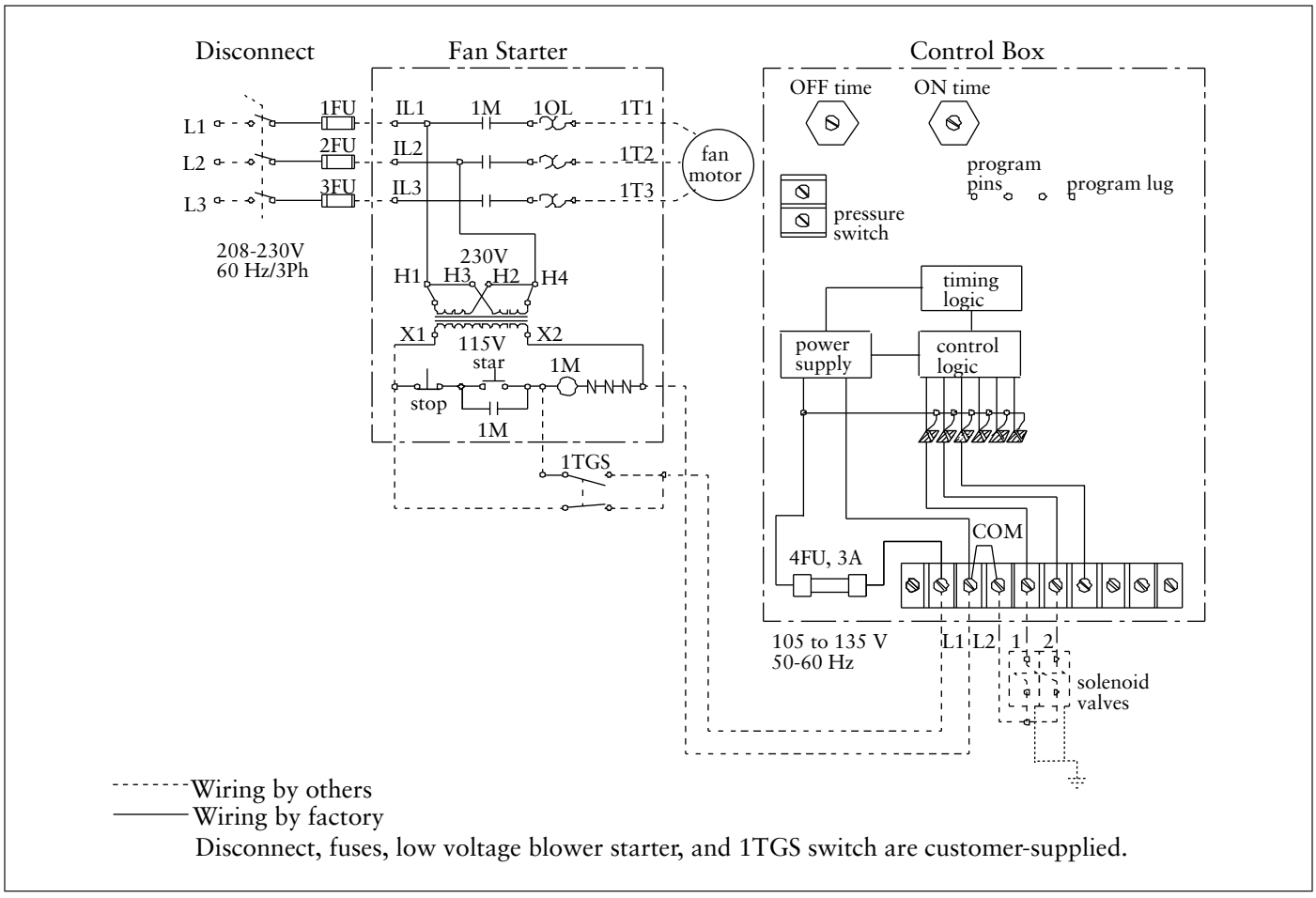
TBV Filter Installation

Solid-State Timer Installation

The standard control panel includes a solid-state timer used to control the filter cleaning system. Install the control box and customer-supplied fan starter switch in a convenient location. Install conduit and wire to the unit.

⚠CAUTION The solid-state timer requires a 105 to 135-Volt customer-supplied power supply. Failure to comply may result in personal injury and/or property damage.

1. Using the wiring diagram supplied, wire the blower motor, blower-motor starter, solid-state timer, and solenoid valves. Use appropriate wire gauge for rated amp load as specified by local codes.
2. Plug the program lug into the pin that corresponds to the number of solenoid valves controlled.
3. With power supply ON, check the operation of the solenoid valves. The valves should open and close sequentially at factory set 10-second intervals.
4. If a Photohelic® gauge or similar device is used to control the solid-state timer and the jumper on the pressure switch portion of the timer is removed, the solenoid valves pulse only when the differential pressure reaches the high-pressure setpoint. The valves continue to pulse until the low-pressure setpoint is reached.



Solid-State Timer Wiring Diagram

Solenoid Connection

The unit is equipped with 115-Volt solenoid valves that control the pulse-cleaning valves, which clean the filters.

Wire the solenoids to the solid-state timer following the wiring diagram supplied with the unit. Filter life and cleaning operation will be affected if not wired correctly.

Timer and Solenoid Specifications

Power to the solid-state timer is supplied to Terminals L1 and L2, which operate in parallel with the blower starter's low-voltage coil. On blower start-up, power is supplied to the timer and the preset OFF time is initiated. At the end of the OFF time, the timer energizes the corresponding solenoid valve to provide the ON time cleaning pulse for one diaphragm valve and then steps to the next until all filters have been cleaned.

To pulse when the blower is OFF, install a toggle switch as shown on the Solid-State Timer Wiring Diagram. When the toggle switch is ON, the timer receives power and energizes the solenoid valves' pulse-cleaning operation even though the blower is turned OFF.

Input

105-135V/50-60Hz/1Ph

Output Solenoids

The load is carried and turned ON and OFF by the 200 watt maximum-load-per-output solid-state switch.

Pulse ON Time

Factory set at 100-milliseconds, or 1/10-second.

NOTICE Do not adjust pulse ON time unless the proper test equipment is available. Too much or too little ON time can cause shortened filter life.

Pulse OFF Time

Factory set at 10-seconds, adjustable from 1 to 1.5-second minimum to maximum 60 to 66-second.

Operating Temperature Range

-20° F to 130° F

Transient Voltage Protection

50 kW transient volts for 20-millisecond duration once every 20 seconds, 1% duty cycle.

Solenoid Valves

110 to 120-Volt AC coil with NEMA 4 rated DIN socket rated at 15 watts includes a 1/2-in conduit fitting. The solenoid valve is part of an integral diaphragm valve assembly. DB-2000 is equipped with 3/4-in solenoid valves and DB-3000 with 1-in solenoid valves.

Compressed-Air

Set compressed-air supply at 90-psig. The timer is factory set to clean one filter or set of filters every 10-seconds.

NOTICE Do not set compressed-air pressure above 100-psig. Component damage will occur.

Compressed Air Installation

⚠WARNING Turn compressed-air supply OFF and bleed lines before performing service or maintenance work.

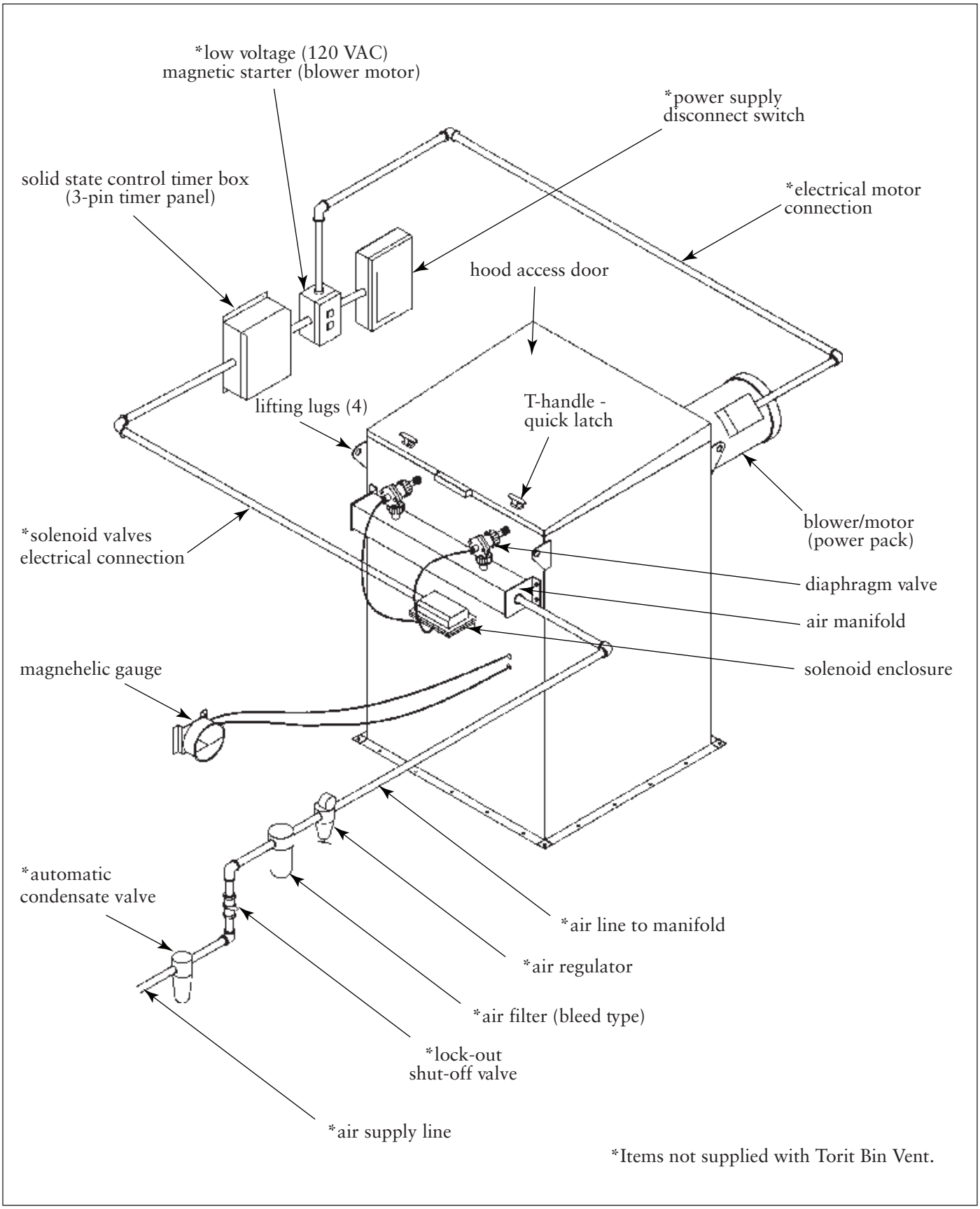
NOTICE The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure or poor collector performance.

Purge compressed-air lines to remove debris before connecting to the unit's compressed-air manifold.

1. Remove the 1-in pipe cap from unit's air manifold and connect the compressed-air supply line. Use thread-sealing tape or pipe sealant on all compressed-air connections.
2. Install a customer-supplied shut-off valve, bleed-type regulator with gauge, filter, and automatic condensate valve in the compressed-air supply line.

NOTICE All compressed-air components must be sized to meet the maximum system requirements of 0.86 cu ft/pulse at 90-psi supply pressure.

Do not increase supply pressure above 100-psi. Component damage can result.



Compressed Air and Component Connections

Magnehelic Gauge

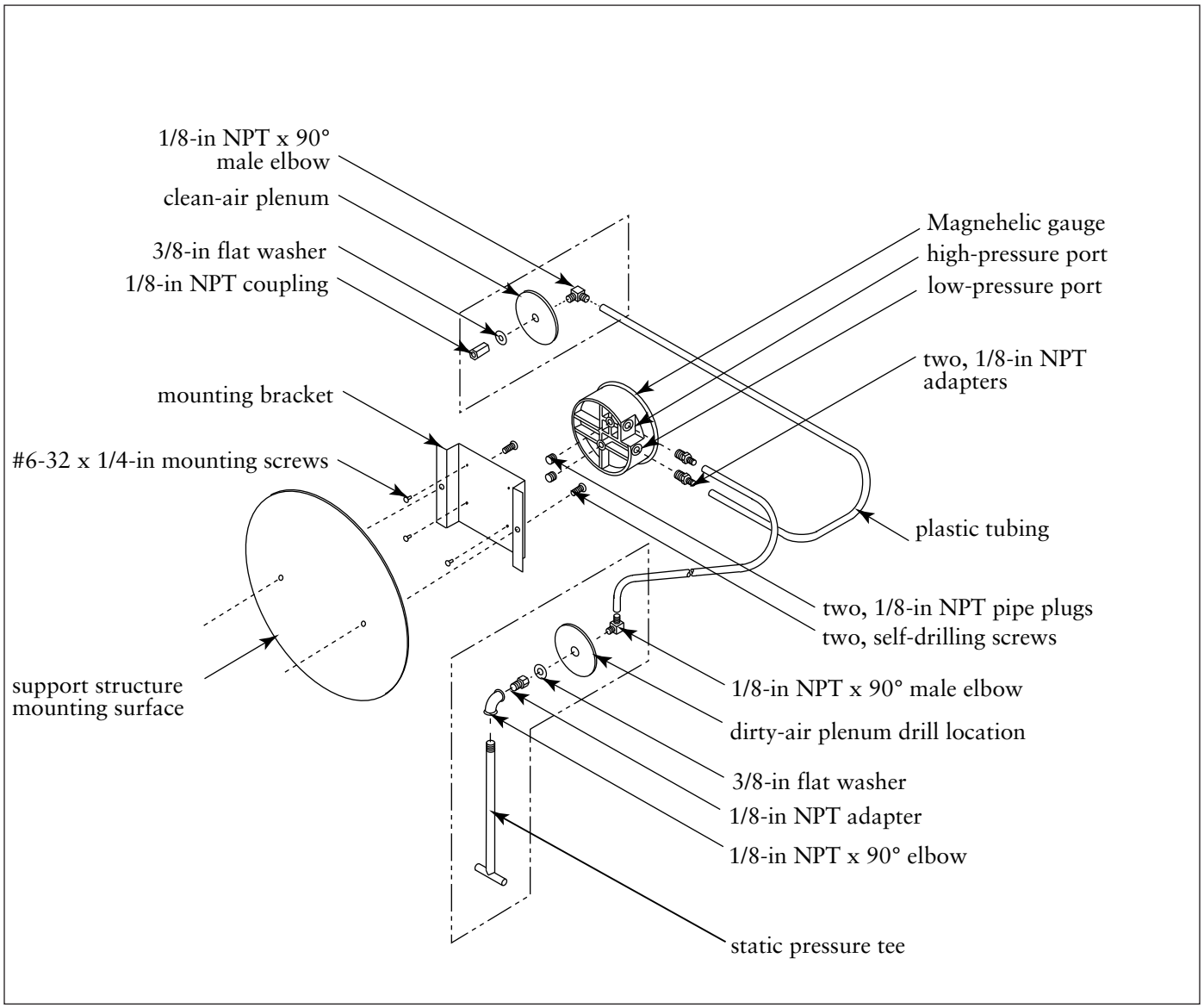
The Magnehelic is a differential pressure gauge used to measure the pressure difference between the clean- and dirty-air plenums and provides a visual display of filter change requirements. The high-pressure tap is located in the dirty-air plenum and the low-pressure tap is located in the clean-air plenum.

The pressure taps for this gauge are factory installed. For units being installed in remote locations, such as on top of silos and storage containers, it is recommended to mount the gauge at ground level adjacent to the control box and motor start switch.

1. Choose a convenient, accessible location on or near the unit for mounting that provides the best visual advantage.

If unit is equipped with factory-installed pressure taps, skip to Step 5.

2. Before drilling, place a piece of non-combustible cloth over the filter opening in the clean-air plenum to protect the filters from drilling chips.
3. Place a piece of wood behind the drill location in the dirty-air plenum to protect the filters from damage by the drill bit.
4. Mount the pressure tap hardware on the clean-air plenum panel. Mount the pressure tap with the tee inside the dirty-air plenum.
5. Plug the pressure ports on the back of the gauge using two, 1/8-in NPT pipe plugs supplied. Install two, 1/8-in NPT male adapters supplied with the gauge into the high- and low-pressure ports on the side of the gauge. Attach the mounting bracket using three, #6-32 x 1/4-in screws supplied.
6. Mount the gauge and bracket assembly to the supporting structure using two self-drilling screws.
7. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge's high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge's low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.
8. Carefully remove the cloth protecting the filters. Close access doors and tighten securely by hand.
9. Zero and maintain the gauge as directed in the manufacturer's Operating and Maintenance Instructions provided.



Magnehelic Gauge Installation

Preliminary Start-Up Check

1. Check all electrical connections for tightness and contact.
2. Check for and remove all loose items in or near the inlet and outlet of the unit.
3. Check that all remote controls are wired into the control system and all service switches are in the OFF position.
4. Check that all optional accessories are installed properly and secured.
5. Check that hopper discharge is open and the storage container is sealed, if equipped.
6. Turn power ON at source.
7. Turn the compressed-air supply ON. Adjust pressure regulator for 90-psi.
8. Turn the fan motor ON then OFF to check for proper rotation by referencing the rotation arrow located on the motor's mounting plate.

⚠WARNING Do not look into fan outlet to determine rotation. View the fan rotation through the back of the motor.

Check that the exhaust plenum is free of tools or debris before checking blower/fan rotation.

Stand clear of exhaust to avoid personal injury.

To reverse rotation, single-phase power supply:

Follow manufacturer's instructions on the motor's nameplate.

To reverse rotation, three-phase power supply:

Turn electrical power OFF at source and switch any two leads on the output-side of the fan-motor starter.

9. Adjust the blower/fan for proper airflow by adjusting the volume control damper on the blower/fan discharge, if equipped.

NOTICE Excess airflow can shorten filter life, cause electrical system failure, and blower motor failure.

Start-Up

1. Turn compressed-air supply ON. Adjust regulator to 90-psi.
2. Turn blower fan motor ON.
3. Adjust airflow using the airflow control damper, if equipped.

Service Information

⚠WARNING Turn power off / lock out electrical power sources before performing service or maintenance work.

Turn compressed air supply OFF and bleed lines before performing service or maintenance work.

Operational Checklist

1. Monitor overall performance of the collector.
2. Monitor exhaust.
3. Monitor pressure drop across filters.
4. Monitor dust disposal.

Filter Element Removal

NOTICE Place filter part-number label (supplied with each replacement filter) over the filter part number listed on the unit's rating plate.

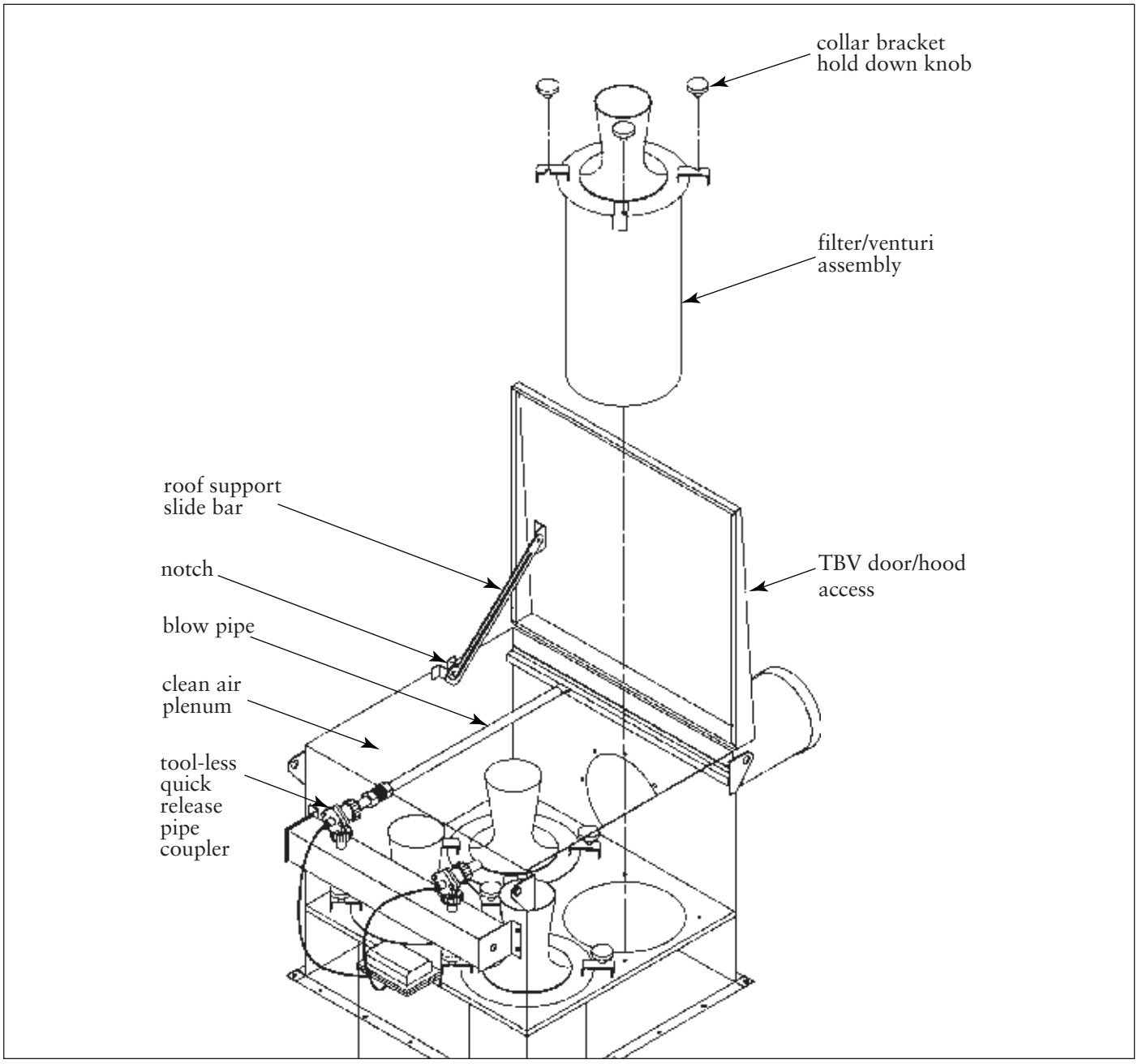
1. After compressed air supply and electrical power have been turned off, open the roof access door of the TBV unit to its fully open position. Make sure that the small notch on the roof support slide bar drops down and locks into position, securing the roof access panel.

⚠CAUTION Failure to open the door properly could result in personal injury. Ensure the door is in the correct open position.

2. Reach inside the clean air plenum of the unit and disconnect the blowpipes by pulling back the levers of the quick-disconnect pipe couplers. Stow the blowpipes in the upright position by inserting them into the slots provided at the rear of the unit.
3. Reach down inside the clean air plenum of the unit and halfway unscrew all the black hold-

down knobs. Reach down inside the venturi and grasp the collar bracket; twist it to the right (clockwise) until the filter hold-down collar clears all four screw studs. Pull up and out to remove the filter element assembly from the unit.

4. Carefully turn the filter element assembly upside down (venturi-side down). Turn the filter crank counterclockwise until completely unscrewed from the quick-nut assembly located in the center of the collar bracket. Once loosened, pull the filter crank out through the filter end cap until clear of the filter assembly.
5. Turn the filter element assembly venturi-side up again and grasp the filter hold-down collar. Pull the filter hold-down collar up to break the gasket seal between the filter and collar. The filter element is now free and can be replaced with a new filter.

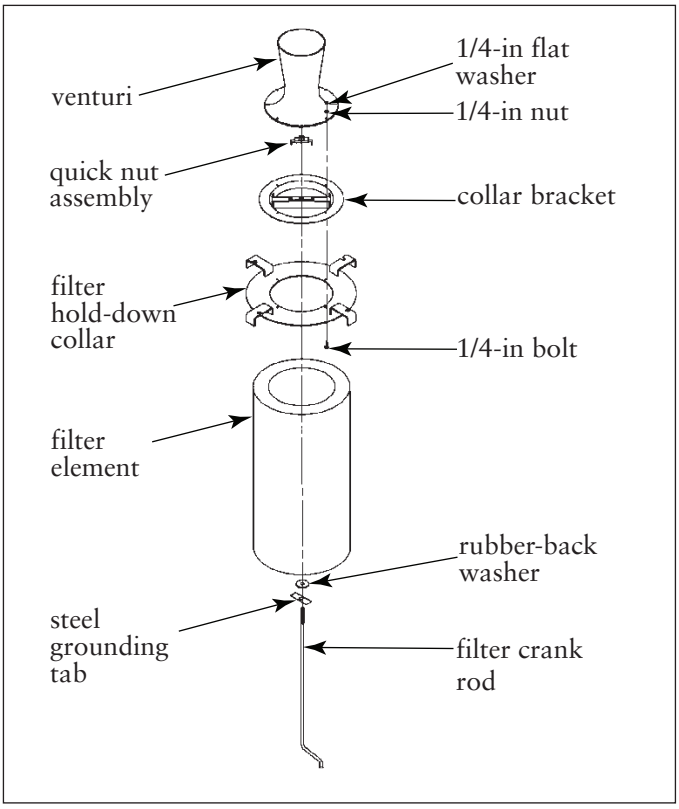


TBV Filter Installation

Filter Element Installation

NOTICE See the Filter Installation for TBV for first time filter installation for insertable models.

1. Place the new filter element end-cap down (gasket-side up). Slide the filter hold-down collar inside the open of the filter element until it stops.
2. Slide the steel grounding tab through the filter crank rod, followed by the rubber-backed washer, rubber side up and away from the crank handle.
3. Slide the filter crank rod through the hole in the filter element end cap and up through the filter cartridge. Align the filter crank rod end with the quick-nut assembly located in the center of the hold-down collar bracket and screw together until the filter cartridge forms an air-tight seal against the filter hold-down collar.
4. Insert the complete filter/venturi assembly back into the clean air plenum until the hold-down collar is flush with bottom of the clean air plenum (tubesheet). Rotate the assembly to the left (counterclockwise) until all four (4) screw studs are engaged.
5. Tighten all black hold-down knobs until secure. Reconnect the blowpipes using the quick release pipe couplers.
6. Grasp the roof access door with one hand and pull up on the bottom of the roof support slide bar with the other to disengage the locked position. Lower the roof access door until closed and secure by twisting the T-handle latches on the top of the roof.



Filter / Venturi Assembly

Optional Equipment

Photohelic Gauge

The Photohelic combines the functions of a differential pressure gauge and a pressure-based switch. The gauge function measures the pressure difference between the clean- and dirty-air plenum and provides a visual display of filter condition. The high-pressure tap is located in the dirty-air plenum and a low-pressure tap is located in the clean-air plenum. The pressure-based switch function provides high-pressure ON and low-pressure OFF control of the filter cleaning system.

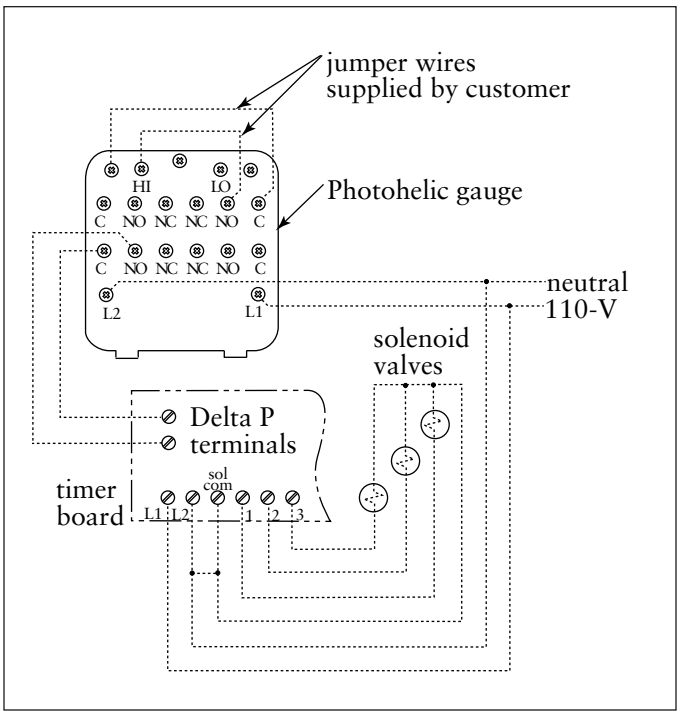
The pressure taps for this gauge are factory installed. For units being installed in remote locations, such as on top of silos or storage bins, it is recommended to mount the gauge at ground level adjacent to the control box and motor start switch.

⚠WARNING Electrical installation must be performed by a qualified electrician and comply with all applicable national and local codes.

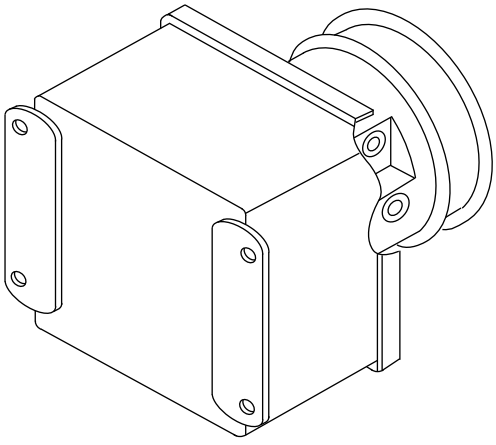
Turn power off and lock out electrical power sources before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

1. Choose a convenient, accessible location on or near the unit for mounting that provides the best visual advantage.
2. Mount the gauge to the remote panel or door using the mounting ring, retaining ring, and four #6-32 x 1 1/4-in screws. Do not tighten screws. Connect two 1/8-in NPT x 1/4-in OD male adapters to the gauge's high- and low-pressure ports. Align the adapters to the 2.375-in hole in the right-hand side of the mounting bracket. Tighten screws.
3. On the back of the gauge, remove four #6-32 x 5/16-in screws and plastic enclosure. Set aside. Add two jumper wires supplied by customer. Remove jumper from pressure switch located on the timer board, if equipped. Using the 3/4-in conduit opening, wire the gauge as shown. Reassemble and fasten the enclosure securely.



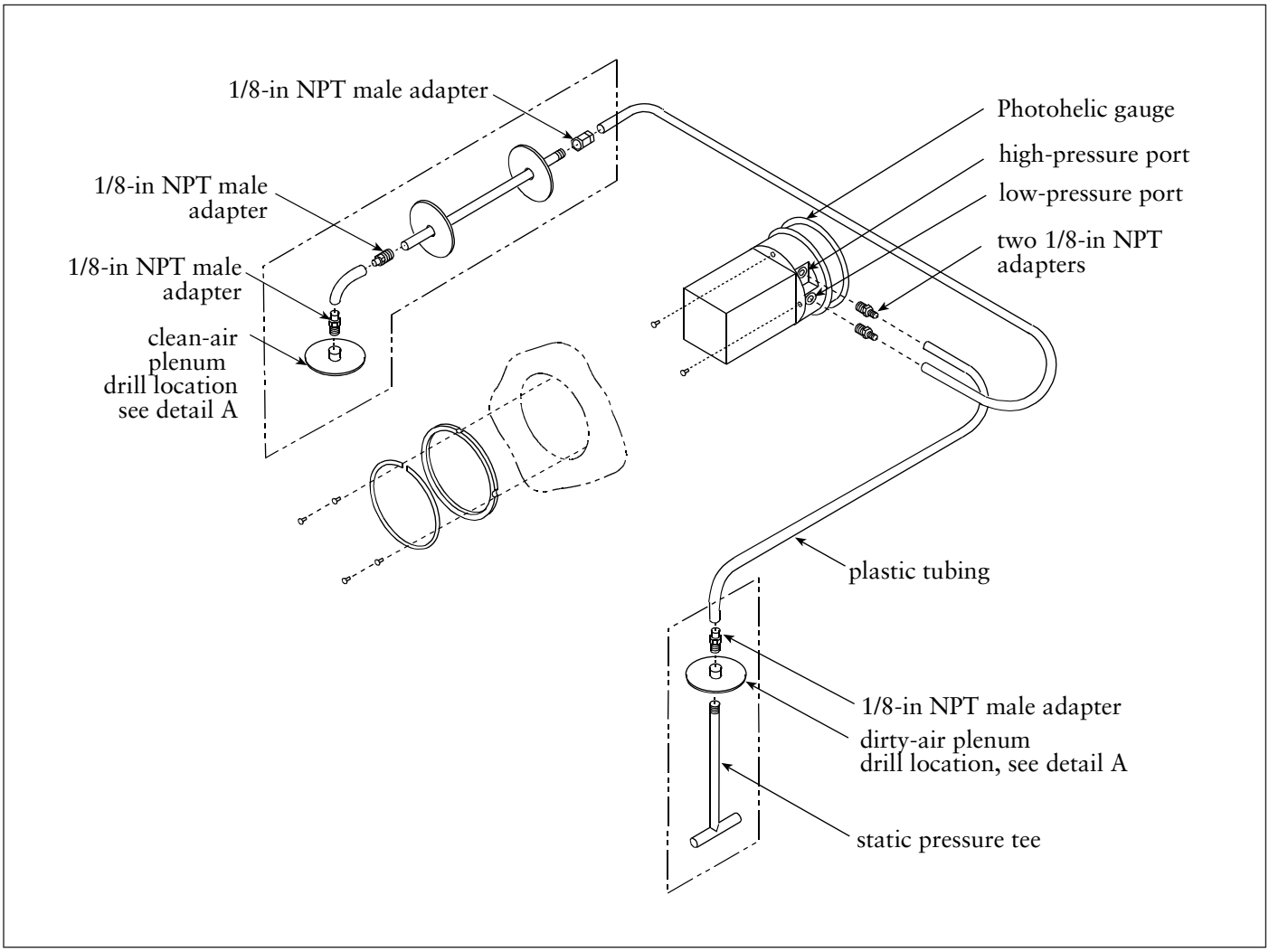
Photohelic Gauge Wiring Diagram



Note:
For use with solid-state timer only.
All parts, except the mounting bracket shown in the Photohelic Gauge Standard Installation drawing are included with the NEMA 4, Weatherproof Enclosure.

Photohelic Gauge in Optional NEMA 4 Weatherproof Enclosure

4. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge's high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge's low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.
5. Zero and maintain the gauge as directed in the manufacturer's Operating and Maintenance Instructions provided.
6. To install the Photohelic gauge mounted in a NEMA 4, Weatherproof Enclosure, follow Steps 4 and 5.



Photohelic Gauge Installation

Delta P Control

Description

The Delta P Control monitors the differential pressure between the clean and dirty air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it controls the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure On, Low Pressure Off, and Alarm. The first two, High Pressure On and Low Pressure Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

Operation

Normal

The Delta P Control monitors the pressure in the clean and dirty air plenums while the unit is running. The blower draws air through the filters, creating a pressure drop. The Delta P control measures the pressure drop and provides a visual display in inches water gauge or metric (SI) units.

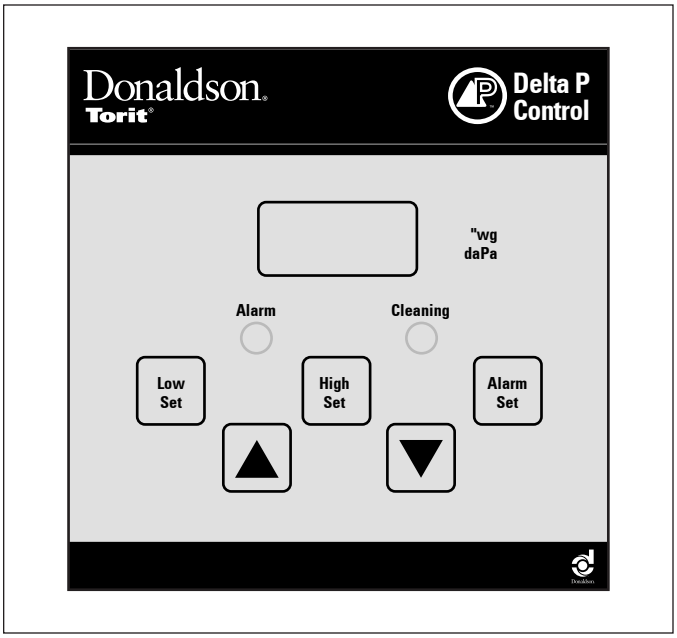
Filter Cleaning

When the pressure drop across the filter bags reach the control's High setpoint, the control closes an output relay allowing a timer to trigger the cleaning valves sequentially. When the control senses that the pressure drop has decreased to the Low setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.

Alarm

The alarm setpoint is set to a higher setting than used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter's useful life. There is a time delay prior to setting the alarm to prevent nuisance trips. The Delta P Control also provides an input connection for a remote alarm reset.

For complete information, see the most current version of the Delta P Installation, Operation, and Maintenance manual.



Delta P Control Display

Delta P Plus Control

The Delta P Plus Control monitors the differential pressure between the clean and dirty air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it controls the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure Drop On, Low Pressure Drop Off, and Alarm. The first two, High Pressure Drop On and Low Pressure Drop Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

The user can program the Delta P Plus Control to pulse while the collector is running, to maintain a relatively constant pressure drop across the filters, pulse only after the collector is shut down (after-shift cleaning), or a combination of both, cleaning while running as well as end of the shift.

Operation

Normal

The Delta P Plus Control monitors the pressure on both sides of the tubesheet while the unit is running. The blower draws air through the filters, creating a pressure drop. The Delta P Plus Control measures the pressure drop and provides a visual display in inches water gauge or metric (SI) units.

Filter Cleaning

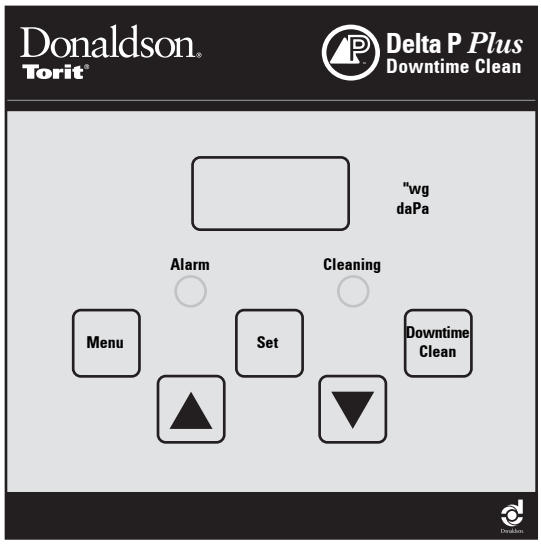
The Delta P Plus Control offers three filter cleaning options.

1. Differential Pressure Cleaning (DFF) - When the pressure drop across the filters reaches the control's High setpoint, the control closes an output relay allowing a sequential timer to trigger the cleaning valves. When the control senses that the pressure drop has decreased to the Low setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.
2. Down Time Cleaning (DTC) - The Delta P Plus Control monitors the collection system. It watches for the blower to start, the pressure drop to exceed the Low setpoint, and then for the pressure drop to approach zero. After the blower has come to a stop, the Delta P Plus engages the cleaning mechanism for a pre-selected time.
3. Combined Differential and Down Time Cleaning (ALL) - The Delta P Plus Control combines the two functions described above; maintaining the pressure drop in a narrow band and down time cleaning the filters when the collector is shut down. The down time cleaning function can be toggled On or Off from the keyboard.

Alarm

The alarm setpoint is set to a higher setting than used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter's useful life. There is a time delay prior to setting the alarm to prevent nuisance trips. The Delta P Plus Control also provides an input connection for a remote alarm reset.

For complete information, see the most current version of the Delta P Plus Installation, Operation, and Maintenance manual.



Delta P Plus Control Display

Power Pack Assembly

The 1 HP through 5 HP power packs are designed to be side-mounted at the rear of the unit. The fan blower housing is factory mounted to the unit.

The blower/motor pack can be installed at any time during installation of the TBV. If the TBV needs to be moved or lifted after the blower/motor pack has been installed, special precautions and careful handling need to be observed to prevent overturning.

⚠WARNING A crane or forklift is recommended for unloading, assembly and installation of the TBV

The TBV has an off-center, high center of gravity when the blower/motor pack is assembled to the unit.

Careful handling is required to avoid overturning the unit during movement.

Radial Blade Power Pack Installation

NOTICE When installing your blower/motor pack:

Use proper equipment and safety guidelines when lifting and installing.

Rotate fan wheel before and after installing into blower housing to assure proper clearance.

A qualified electrician MUST wire the motor to its electrical source.

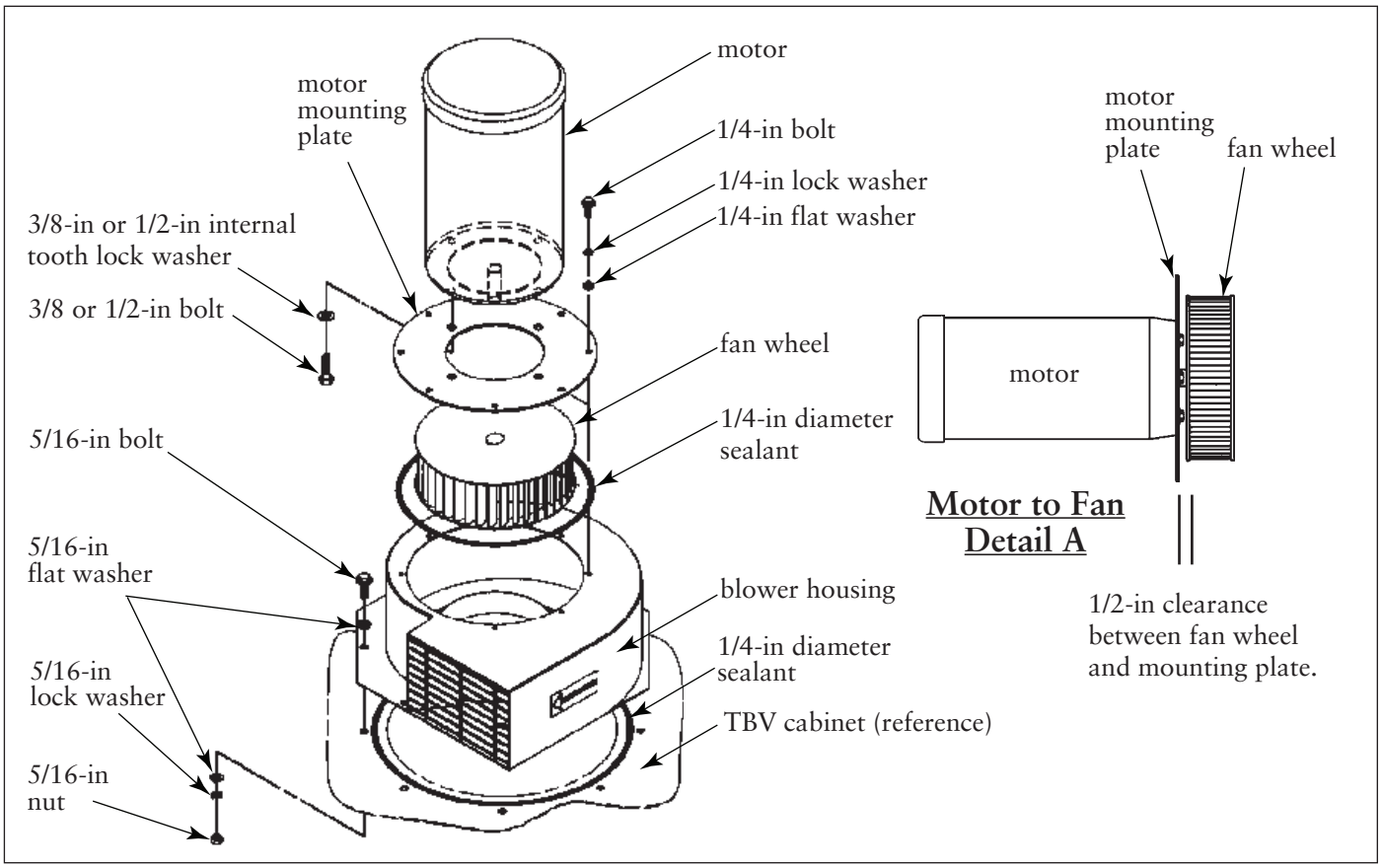
Fan wheel rotation is clockwise.

To avoid water damage, do not direct the fan blower housing outlet straight up into the sky.

1. Attach the motor to the motor mounting plate with four (4) mounting bolts and washers. Torque down the bolts to the following specifications:

Motor	Torque (ft./ lbs.)	Bolt Size
1 HP	15	3/8-in
2 HP	15	3/8-in
3 HP	15	3/8-in
5 HP	35	1/2-in

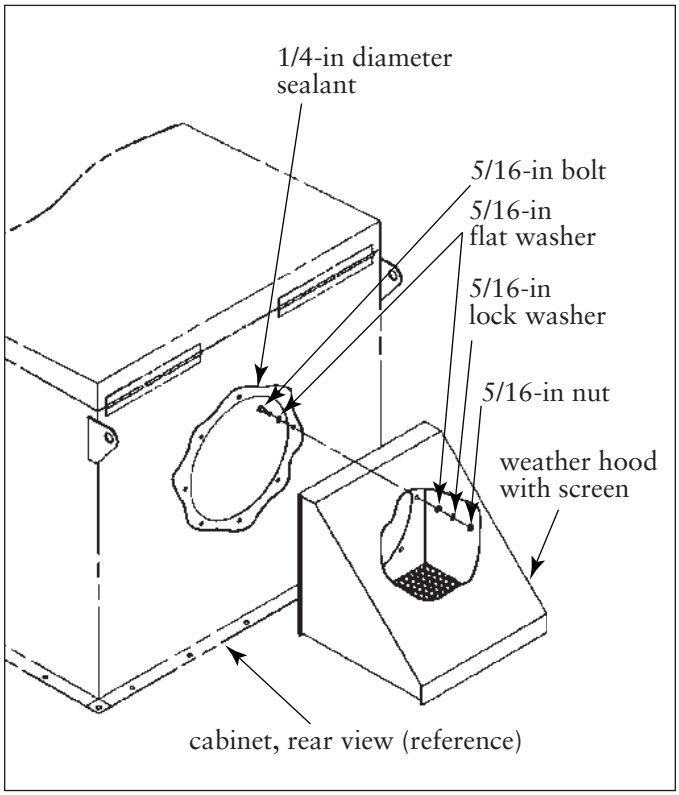
2. Loosen the two set screws in the fan wheel and slip on to the motor shaft. The key in the motor shaft should be lined up with the slot in the fan wheel. Adjust for 1/2-in clearance between the fan wheel and the motor mounting plate and tighten the set screws.
3. Use sealer between the blower housing and the motor mounting plate before attaching the motor/fan assembly to the blower housing. If the blower housing was not factory installed to the unit, use sealer between the blower housing and the unit as well.
4. If the blower housing was not factory installed, mount it to the TBV unit using eight (8) 5/16-in bolts, flat washers and nuts as shown. Make sure that the sealer is already between the blower housing and the unit (see Step 3).
5. Attach the motor/fan assembly to the blower housing with eight (8) bolts, washers and lock washers. Make sure that the sealer is between the housing and the unit (see Step 3).



Radial Blade Power Pack Installation

Weather Hood

The weather hood keeps rain, snow and birds from entering the unit, all of which can cause the TBV to function improperly. It is strongly recommended for units that are not powered or ducted. To install the weather hood, place 1/4-in diameter sealer between the cabinet side and the weatherhood. Position the weather hood over the outlet hole and attach to the cabinet using the eight (8) 5/16-in bolts provided. The bolts must be inserted from inside the clean air plenum, since the weather hood has a bird screen covering the weather hood outlet.

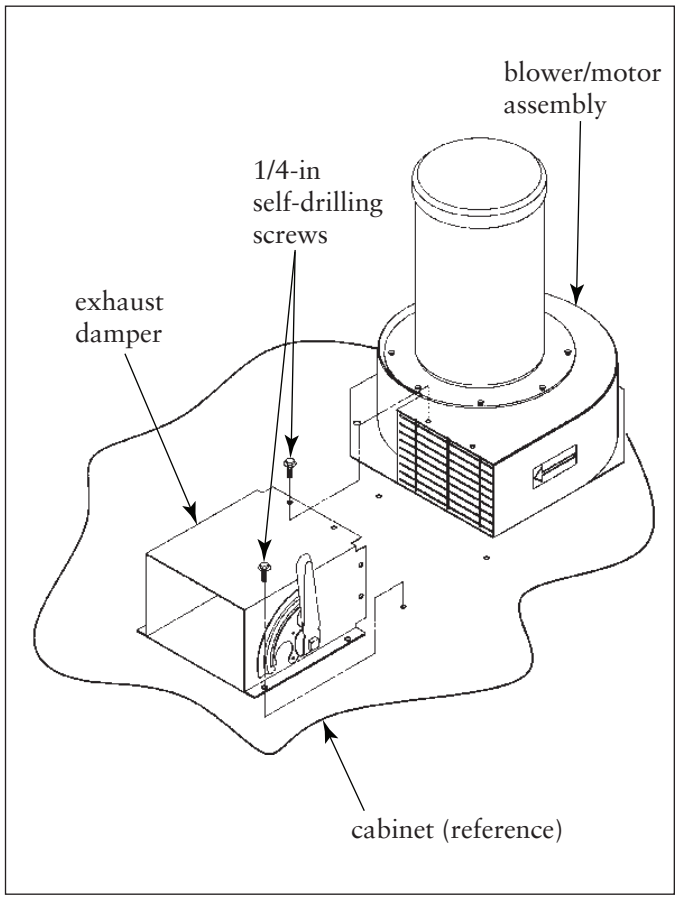


Weather Hood Installation

Exhaust Damper

Exhaust dampers are available for use with the optional blower/motor assemblies to control system flow. This type of exhaust damper is attached to the blower housing outlet, but is not required when a plenum silencer is used.

Some exhaust dampers are shipped pre-assembled to the blower outlet. If the exhaust damper is shipped loose, refer to the installation drawing shipped with it and the below illustration for detailed installation instructions. The exhaust damper is mounted to the fan housing outlet by sliding it over the blower housing and securing it with 1/4-in thread cutting screws. There is a limit to exhaust damper mounting configurations due to cabinet size. For outside applications where water damage is possible, never mount the exhaust damper and blower housing with the outlet pointing up.

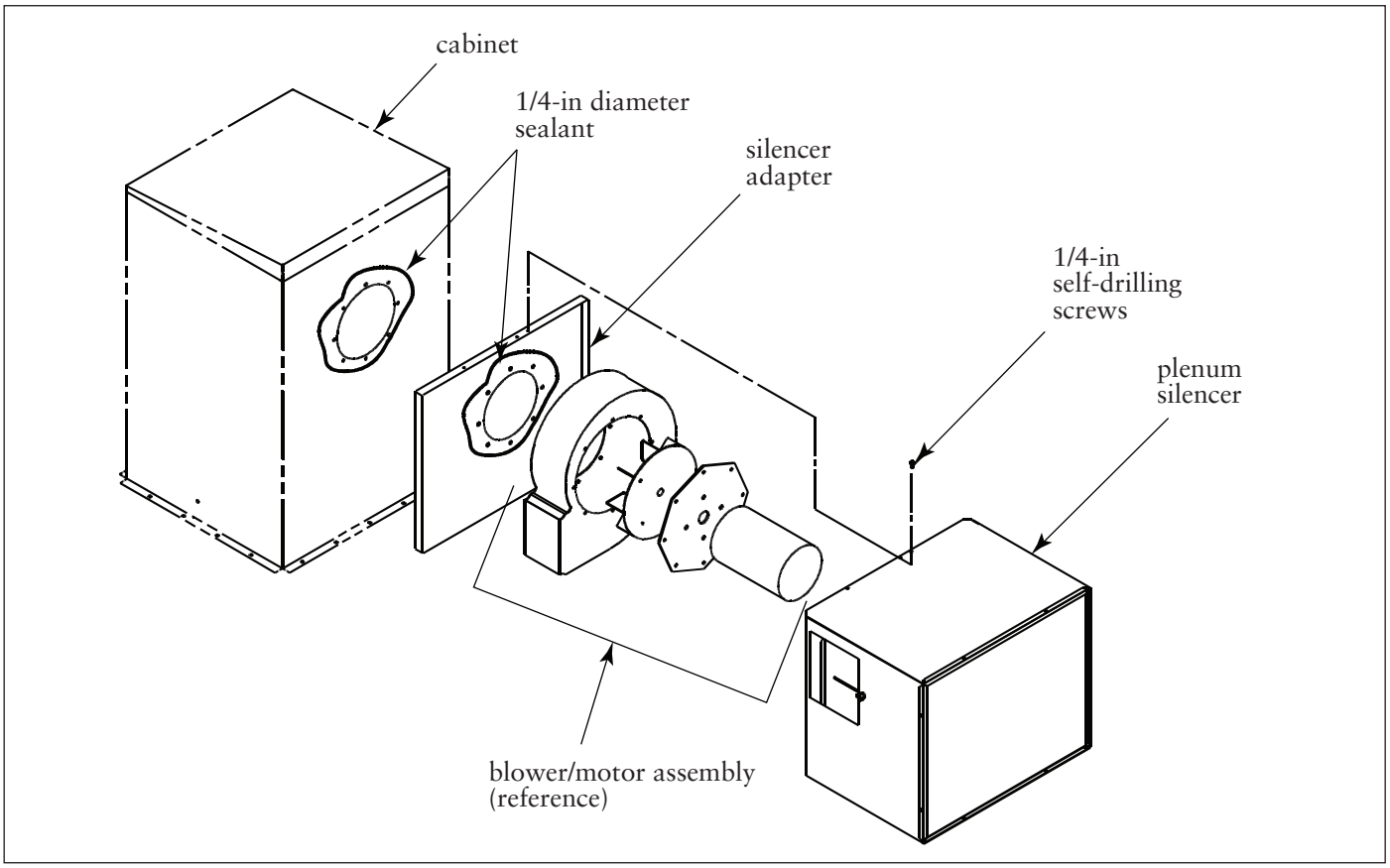


Exhaust Damper Installation

Plenum Silencer

Plenum silencers are available for the blower/motor assemblies. The plenum silencers are designed to be mounted on the side of the TBV in line with the selected blower/motor assembly. The plenum silencers are equipped with an exhaust damper for flow control, making it unnecessary to select a separate damper assembly for the selected blower/motor assembly. It is important to note that for the TBV plenum models, only TWO (2) plenum silencer mounting configurations will work without interfering with roof opening procedures. For the TBV insertable models, only ONE (1) possible plenum silencer mounting configuration will work.

Although the plenum silencer primarily reduces noise levels, it is also equipped with a built-in exhaust damper. The plenum silencer mounting configuration varies between the TBV plenum and insertable models. For the TBV plenum model, there are two possible mounting configurations. For the TBV insertable model, there is only ONE possible mounting configuration. The blower/motor plenum silencers are shipped loose and must be assembled and installed concurrently with the blower/motor assembly. Mount the plenum silencer to the side of the cabinet by drilling holes into the cabinet using the existing holes in the silencer adapter mounting plate as a guide. Fasten down using the 1/4-in thread cutting screws provided. Refer to the below illustration and the installation drawing shipped with the plenum silencer instructions.



Plenum Silencer Installation

Troubleshooting

Problem	Probable Cause	Remedy
Blower fan and motor do not start	Improper motor wire size	Rewire using the correct wire gauge as specified by national and local codes.
	Not wired correctly	Check and correct motor wiring for supply voltage. See motor manufacturer's wiring diagram. Follow wiring diagram and the National Electric Code.
	Unit not wired for available voltage	Correct wiring for proper supply voltage.
	Input circuit down	Check power supply to motor circuit on all leads.
	Electrical supply circuit down	Check power supply circuit for proper voltage. Check for fuse or circuit breaker fault. Replace as necessary.
Blower fan and motor start, but do not stay running	Incorrect motor starter installed	Check for proper motor starter and replace if necessary.
	Access doors are open or not closed tight	Close and tighten access doors. See Filter Replacement section.
	Electrical circuit overload	Check that the power supply circuit has sufficient power to run all equipment.
Clean-air outlet discharging dust	Filters not installed correctly	See Filter Replacment section.
	Filter damage, dents in the end caps, gasket damage, or holes in media	Replace filters as necessary. Use only genuine Donaldson replacement parts. See Filter Replacment section.
	Access cover(s) loose	Tighten access doors securely. See Filter Replacement section.
Insufficient airflow	Fan rotation backwards	Proper fan rotation is clockwise from the top of the unit. The fan can be viewed through the back of the motor. See Preliminary Start-Up Check.
	Access doors open or not closed tight	Check that all access doors are in place and secured.
	Fan exhaust area restricted	Check fan exhaust area for obstructions. Remove material or debris. Adjust damper flow control.
	Filters need replacement	Remove and replace using genuine Donaldson replacement filters. See Filter Replacement section.

Troubleshooting

Problem	Probable Cause	Remedy
Insufficient airflow continued	Lack of compressed air	Check that a minimum of 90-psig is available. See Compressed Air Supply section.
	Pulse cleaning not energized	Use a voltmeter to check supply voltage to the timer board. Check and replace the fuse on the timer board if necessary. See Solid-State Timer section.
	Dust storage area overfilled or plugged	Clean out dust storage area. See Dust Disposal section.
	Pulse valves leaking compressed air	Lock out all electrical power to the unit and bleed the compressed air supply. Check for debris, valve wear, pneumatic tubing fault, or diaphragm failure by removing the diaphragm cover on the pulse valves. Check for solenoid leaks or damage. If pulse valves or solenoid valves and tubing are damaged, replace.
	Solid-State Timer failure	Using a voltmeter, check supply voltage to the timer board. Check and replace the fuse on the timer board if necessary. If the fuse is good and input power is present, but output voltage to the solenoid valves is not, replace the timer board. See Solid-State Timer section.
	Solid-State Timer out of adjustment	See Solid-State Timer Wiring Diagram.

The Donaldson Torit Warranty

Donaldson warrants to the original purchaser that the major structural components of the goods will be free from defects in materials and workmanship for ten (10) years from the date of shipment, if properly installed, maintained and operated under normal conditions. Donaldson warrants all other Donaldson built components and accessories including Donaldson Airlocks, TBI Fans, TRB Fans, Fume Collector products, Donaldson built electrical control components and Donaldson built Afterfilter housings for twelve (12) months from date of shipment. Donaldson warrants Donaldson built filter elements to be free from defects in materials and workmanship for eighteen (18) months from date of shipment. Donaldson does not warrant against damages due to corrosion, abrasion, normal wear and tear, product modification, or product misapplication. Donaldson also makes no warranty whatsoever as to any goods manufactured or supplied by others including electric motors, fans and control components. After Donaldson has been given adequate opportunity to remedy any defects in material or workmanship, Donaldson retains the sole option to accept return of the goods, with freight paid by the purchaser, and to refund the purchase price for the goods after confirming the goods are returned undamaged and in usable condition. Such a refund will be in the full extent of Donaldson's liability. Donaldson shall not be liable for any other costs, expenses or damages whether direct, indirect, special, incidental, consequential or otherwise. The terms of this warranty may be modified only by a special warranty document signed by a Director, General Manager or Vice President of Donaldson. Failure to use genuine Donaldson replacement parts may void this warranty. **THERE EXIST NO OTHER REPRESENTATIONS, WARRANTIES OR GUARANTEES EXCEPT AS STATED IN THIS PARAGRAPH AND ALL OTHER WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHETHER EXPRESS OR IMPLIED ARE HEREBY EXPRESSLY EXCLUDED AND DISCLAIMED.**

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and parts, call the Parts Express Line

800-365-1331 USA
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For faster service, have unit's model and serial number,
part number, description, and quantity available.

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